

WHAT IS CLAIMED IS:

1. A hemofiltration system to treat an inflammatory mediator related disease in a mammal, comprising:

5 a hemofilter operable to remove ultrafiltrate from a blood stream extracted from the mammal and to create a filtered blood stream and an ultrafiltrate stream;

an adsorptive device containing at least one adsorbent material operable to receive the ultrafiltrate stream from the hemofilter and to remove a wide range of inflammatory mediators therefrom to create a post adsorption ultrafiltrate stream;

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the adsorbent material selected from a group consisting of coated materials, uncoated materials, a matrix of rods, a matrix configured for convenient presentation of ultrafiltrate to adsorbent material, beads, and particulates and any combination thereof; and

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tubing for use in combining the post adsorption ultrafiltrate stream with the filtered blood stream and returning the combined stream to the mammal.

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2. The hemofiltration system of Claim 1, wherein the adsorbent material is comprised of adsorbent resins selected from a group consisting of immobilized polymyxin B , polystyrene-derivative fibers, cation exchange resins, neutral exchange resins, anion exchange resins, cellulose materials, polysulfone, polyacrylonitrile, polymethylmethacrylate, polyvinyl-alcohol, polyamide, polycarbonate, cellulose derivatives, specific antibody coated materials, specific antagonist coated materials, and any combination thereof.

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3. The hemofiltration system of Claim 1, wherein the ultrafiltrate stream comprises plasma water, electrolytes, blood peptides and proteins.

5        4. The hemofiltration system of Claim 1, wherein the hemofilter comprises a material selected from the group of polysulfone, polyacrylonitrile, polymethylmethacrylate, polyvinyl-alcohol, polyamide, polycarbonate, and cellulose derivatives, and the jacket  
10 comprises polycarbonate.

5. The hemofiltration system of Claim 1, wherein the adsorbent material is selected from a group consisting of activated charcoal, uncharged resins,  
15 charged resins, silica, immobilized polymyxin B, anion exchange resin, cation exchange resin, neutral exchange resin, polysulfone, polyacrylonitrile, polymethylmethacrylate, polyvinyl-alcohol, polyamide, polycarbonate, cellulose derivatives, immobilized  
20 monoclonal antibodies, immobilized IM receptors, immobilized specific antagonists, and any combination thereof.

6. A hemofiltration system to treat an inflammatory mediator related disease including sepsis and septic shock in a mammal, comprising:

5 a hemofilter operable to remove ultrafiltrate from a blood stream extracted from the mammal and to create a filtered blood stream and an ultrafiltrate stream;

an adsorptive device containing at least one adsorbent material operable to receive the ultrafiltrate stream from the hemofilter and to remove at least one  
10 inflammatory mediator therefrom to create a post adsorption ultrafiltrate stream;

the adsorbent material selected from a group consisting of coated materials, uncoated materials, a matrix of rods, a matrix configured for convenient  
15 presentation of ultrafiltrate to adsorbent material, beads, and particulates and any combination thereof; and

means for selectively combining the post adsorption ultrafiltrate stream with the filtered blood stream and returning the combined stream to the mammal.

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7. The hemofiltration system of Claim 6, wherein the adsorbent material is comprised of adsorbent resins selected from a group consisting of immobilized polymyxin B , polystyrene-derivative fibers, cation exchange  
25 resins, neutral exchange resins, anion exchange resins, cellulose materials, polysulfone, polyacrylonitrile, polymethylmethacrylate, polyvinyl-alcohol, polyamide, polycarbonate, cellulose derivatives, specific antibody coated materials, specific antagonist coated materials,  
30 and any combination thereof.

8. The hemofiltration system of Claim 6, wherein the ultrafiltrate stream comprises plasma water, electrolytes, blood peptides and proteins.

5 9. The hemofiltration system of Claim 6, wherein the hemofilter comprises a material selected from the group of polysulfone, polyacrylonitrile, polymethylmethacrylate, polyvinyl-alcohol, polyamide, polycarbonate, and cellulose derivatives, and the jacket  
10 comprises polycarbonate.

10. The hemofiltration system of Claim 6, wherein the adsorbent material is selected from a group consisting of activated charcoal, uncharged resins,  
15 charged resins, silica, immobilized polymyxin B, anion exchange resin, cation exchange resin, neutral exchange resin, polysulfone, polyacrylonitrile, polymethylmethacrylate, polyvinyl-alcohol, polyamide, polycarbonate, cellulose derivatives, immobilized  
20 monoclonal antibodies, immobilized IM receptors, immobilized specific antagonists, and any combination thereof.

11. A hemofiltration system to treat an inflammatory mediator related disease in a mammal, comprising:

5 a hemofilter operable to remove ultrafiltrate from a blood stream extracted from the mammal and to create a filtered blood stream and an ultrafiltrate stream;

an adsorptive device containing at least one adsorbent material operable to receive the ultrafiltrate stream from the hemofilter and to remove a wide range of inflammatory mediators therefrom to create a post  
10 adsorption ultrafiltrate stream;

the adsorbent material selected from a group consisting of coated materials, uncoated materials, a matrix of rods, a matrix configured for convenient  
15 presentation of ultrafiltrate to adsorbent material, beads, and particulates and any combination thereof;

tubing operable to combine the post adsorption ultrafiltrate stream with the filtered blood stream and return the combined stream to the mammal;

20 a first pump to transfer the post adsorption ultrafiltrate stream from the adsorptive device; and

a second pump to transfer a portion of the post adsorption ultrafiltrate stream which is not returned to the mammal to the waste reservoir using a second  
25 ultrafiltrate pump.

12. The hemofiltration system of Claim 11 wherein  
the adsorbent material is comprised of adsorbent resins  
selected from a group consisting of immobilized polymyxin  
B , polystyrene-derivative fibers, cation exchange  
5 resins, neutral exchange resins, anion exchange resins,  
cellulose materials, polysulfone, polyacrylonitrile,  
polymethylmethacrylate, polyvinyl-alcohol, polyamide,  
polycarbonate, cellulose derivatives, specific antibody  
coated materials, specific antagonist coated materials,  
10 and any combination thereof.

13. The hemofiltration system of Claim 11, wherein  
the ultrafiltrate stream comprises plasma water,  
electrolytes, blood peptides and proteins.  
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14. The hemofiltration system of Claim 11, wherein  
the hemofilter comprises a material selected from the  
group of polysulfone, polyacrylonitrile,  
polymethylmethacrylate, polyvinyl-alcohol, polyamide,  
20 polycarbonate, and cellulose derivatives, and the jacket  
comprises polycarbonate.

15. The hemofiltration system of Claim 11, wherein  
the adsorbent material is selected from a group  
consisting of activated charcoal, uncharged resins,  
charged resins, silica, immobilized polymyxin B, anion  
5 exchange resin, cation exchange resin, neutral exchange  
resin, polysulfone, polyacrylonitrile,  
polymethylmethacrylate, polyvinyl-alcohol, polyamide,  
polycarbonate, cellulose derivatives, immobilized  
monoclonal antibodies, immobilized IM receptors,  
10 immobilized specific antagonists, and any combination  
thereof.